Removing indoor pollution: Researcher helps create sun-powered solution to toxic air in many lands

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Catlin Powers was working in the Himalayas when the question about indoor air pollution vs. outdoor pollution was first raised. To reduce indoor air pollution, the Harvard School of Public Health graduate helped create SolSource, an emission-free solar cooker (photo 2). Currently Powers is working to harness the extra energy provided by SolSource for other uses, including heating buildings. Credit: Catlin Powers

While studying climate change in the rural Himalayas, Catlin Powers was asked an eye-opening question by one local family: Why are all of these scientists coming here to study outdoor air pollution when indoor air pollution is so much worse?

A Harvard School of Public Health (HSPH) graduate and current Ph.D. candidate in environmental health, Powers is the co-founder of One Earth Designs, a company that creates products that enable people to improve the quality of their lives by wisely using energy resources. She is one of the creative forces behind SolSource, a revolutionary, sun-powered grill designed specifically to answer that family's question.

Powers began her journey by measuring the indoor air quality inside the Himalayan home where the question was posed, and found that it was 10 times more polluted than the outdoor air in Beijing. Subsequently, she found that more than half a million people each year die in China from the toxic smoke coming from household stoves used for cooking and heating.

Spurred by these revelations, Powers began working directly with rural communities to explore energy solutions and alternate fuel sources for cooking in their homes.

The result was SolSource, a high-performance, low-maintenance, portable, durable, safe, and fuel- and emission-free solar cooker. SolSource harnesses energy from the sun, which is ample on the Himalayan plateau, and uses it to grill, steam, bake, boil, or fry. Cooking with SolSource saves families time and money, reduces their exposure to harmful stove pollution, and helps conserve precious resources.

One Earth Designs recently ended a successful Kickstarter campaign to help fund production of SolSource, as well as to explore a cost-offsetting model for developing nations. The campaign ended with 330 percent of

its goal funded.

During a recent question-and-answer session through the Office for Sustainability (OFS), Powers talked about her work.

OFS: What are you most excited about for the future and for the potential SolSource holds in Asia and in the rest of the world?

POWERS: Achieving a 100 percent renewable energy future for all—SolSource is a solar cooker, but it harnesses a tremendous amount of energy beyond what is needed for cooking. So we are working on harnessing that energy for electricity, household heating, water purification, and waste processing. Today, you can eat healthy, delicious solar [-cooked] food. Tomorrow, your solar grill could be powering your house, your car, and your life.

With SolSource, we hope to continue to help under-consuming families leapfrog into a highly aspirational solar energy future, as well as to help over-consuming families enjoy life just as much while consuming fewer nonrenewable resources.

Given all that is happening with our climate, energy seems like a great place to start. One hour of sunlight provides enough energy to supply all human needs for an entire year. The potential is huge if we could only enable more people to harness it.

OFS: What's the one thing you hope people take away from your product?

POWERS: Everyone around the world essentially wants and needs the same basic things, so let's design an equitable human lifestyle that gives

us all a brighter future here on Earth. That future is going to require products and systems that make it fun and convenient to live using fewer finite resources and that close the loop on our waste stream.

OFS: What are the challenges in adopting and implementing small-scale renewable energy sources in the developing world?

POWERS: People often talk about the last-mile challenge from a logistics perspective, but we've actually found that people are willing to travel long distances to access SolSource in town centers and other regional hubs. Our bigger challenge is price constraint. For example, we spoke with families in northern Myanmar who wanted SolSource, but who had never owned a product that cost more than 16 U.S. dollars, and they were taking out loans to afford even those.

Some people might say we should just use cheaper materials. But we realized early on that it is often the most price-constrained families that need the highest-quality products. These families tend to live in places with harsh environmental conditions, sometimes amidst warfare, and often with the need for frequent migration. Performance and durability are crucial.

OFS: How did your experiences and studies at Harvard influence or contribute to SolSource?

POWERS: My experience at Harvard prepared and allowed me to understand the challenge at hand, and how to measure the effectiveness of the solutions. We developed 54 prototypes of solar cookers before we developed SolSource. We trained citizen scientists from inside the villages to monitor its impact on pollution and cost savings, and we purchased state-of-the-art monitoring equipment to support this work.

Much of this was funded through grants and fellowships from the Environmental Protection Agency and the National Science Foundation, which were hosted by Harvard. I also received a scholarship from Harvard to finish my graduate studies, and would not have been able to complete the work without this support.

So much of the guidance I've received comes directly from my advisory committee at HSPH. Jack Spengler, James Butler, Majid Ezzati, and Christopher Barr were invaluable resources in the evaluation of SolSource, as well as in my personal development.

OFS: Do you have a few tips/advice for aspiring "green-preneurs"?

POWERS: I always love trading learning with other doers out there. Here are some of the ones that have been most important for me over time.

1. If you have co-founders, your relationship with them means everything about the success or failure of your company. Fighting is fine and natural, but you have to respect each other and know how to communicate effectively.

2. Take the time to stop and think about the bigger context of your work, and make sure that you are still building toward the world you want to live in in the future.

3. Remember to sleep.

Provided by Harvard University